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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/889,860	07/23/2001	Jean-Michel Georges	BDL-341XX	1184

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EXAMINER	
AFTERGUT, JEFF H	
ART UNIT	**PAPER NUMBER**
1733	

DATE MAILED: 10/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/889,860	GEORGES ET AL.	
	Examiner	Art Unit	
	Jeff H. Aftergut	1733	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 September 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13 and 15-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13 and 15-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1-4, 6-10, 12, 13, 15, 18, 19, 21, 22, 23 and 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over E.P. 913,504 in view of Soviet Union Patent abstract number 1699755 (abstract and clipped image) for the same reasons as previously given in paper no. 4, paragraph 5.

With regard to the newly added claims 25-27, the reference to E.P. '504 clearly expressed a desire to employ phenolic resins to impregnate the fibers in the densified crucible. Regarding claims 26 and 27, the reference to E.P. '504 suggested a final chemical vapor infiltration operation. Such would intrinsically increase the resistance to silicon corrosion (as applicant provided no additional processing and attain the enhanced corrosion resistance). As previously noted, Soviet Union Patent '755 suggested that one skilled in the art would have made the plug material from the same material that the remainder of the crucible body was made from. One viewing the same would have readily appreciated that the plug in E.P. '504 would have been manufactured from carbon-carbon composite material as the body in E.P. '504 was made from the same and there is evidence to suggest one skilled in the art would have employed the same thermostructural material for the plug as the remainder of the body. Regarding claim 23, as noted in paper no. 4, paragraph 4, it was taken as conventional in the art at the time the invention was made to employ a single furnace and/or chemical vapor infiltration device for application of coatings and/or carbonization of multiple components. The use of single device to graphitize and/or apply coatings via CVD would have been obvious to the ordinary artisan in the operation

set forth above in particular because the reference suggested the formation of two crucibles at the same time (see EP '504 where two crucibles were simultaneously wound). To utilize conventional and well known processing to form multiple articles simultaneously would have been within the purview of the ordinary artisan. As one formed two devices from a single winding in E.P. '504, it would have been obvious to infiltrate both bowls simultaneously with a single furnace.

3. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over the references as set forth above in paragraph 2 further taken with either one of Ioki et al (newly cited) or De Jager (newly cited).

Claim 5 has been amended to exclude phenol resin from the group of resins employed in the operation of forming the carbon-carbon composite via filament winding. However, those skilled in the art of manufacturing carbon-carbon composite structures via filament winding, for example, would have readily appreciated that there were various precursor resins useful for impregnating the filaments prior to the winding operation wherein the resins were subsequently subjected to heat to convert to carbon matrix. Such resin precursors included not only phenol resins but also furan and epoxy resins as evidenced by Ioki et al or De Jager. More specifically, applicant is referred to column 5, lines 15-17 of Ioki et al for the use of any one of phenol, furan or epoxy to impregnate the filaments prior to shaping the same via filament winding and conversion to carbon-carbon composite and column 6, lines 34-42 of De Jager for the specific use of any one of phenolic resin, epoxy resin or furan resin for the precursor binder for impregnation of the reinforcing fibers prior to winding and conversion into carbon-carbon composite material. it would have been obvious to one of ordinary skill in the art at the time the

invention was made to employ a resin suitable for conversion into carbon (a precursor resin) for a matrix of carbon in a carbon-carbon composite wherein the resin used in the impregnation of the reinforcing fibers not only included phenolic resins but also furan and epoxy as evidenced by either one of Ioki et al or De Jager in the operation of forming a crucible by filament winding as set forth above in paragraph 2 where a phenolic resin was used in the impregnation of the fibers.

4. Claims 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over the references as set forth above in paragraph 2 further taken with Japanese patent 11-255586 for the same reasons as expressed in paper no. 4, paragraph 4.

5. Claims 16-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as set forth above in paragraph 2 further taken with any one of Holcombe et al, Kondo et al or Metter et al for the same reasons as expressed in paper no. 4, paragraphs 6 and 7.

6. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over the references as set forth above in paragraph 5 further in view of Japanese Patent 11-255586 for the same reasons as expressed in paper no. 4, paragraph 8.

Response to Arguments

7. Applicant's arguments with respect to claims 1-13 and 15-27 have been considered but are moot in view of the new ground(s) of rejection.

The applicant argues that the reference to Soviet Union '755 does not cure the deficiencies of E.P. '504 in that the reference taught that the plug was formed from graphite and not from thermostructural material (which applicant defined in the specification as being a fiber reinforced material with either a ceramic matrix or carbon matrix material. the reference to Soviet Union '755 did in fact form the plug from graphite material, however the abstract made it

clear that the plug material employed was the same material that was used for the remainder of the crucible. The crucible in Soviet Union '755 was made of graphite and thus the plug was made of graphite. One viewing the same would have ascertained that if the crucible was manufacture of thermostructural material that the plug would have likewise been manufactured from thermostructural material. it would have been within the purview of the ordinary artisan in E.P. '504 (which formed the crucible from thermostructural material and which incorporated a plug of unspecified material) to form the plug from the same material as the crucible body as such as suggested by Soviet Union '755 and none but the expected benefits would have been achieved.

Regarding claim 5, the newly cited references suggested that furan and epoxy were well known alternatives to phenolic resins for impregnating fibers prior to shaping via filament winding with a precursor to a carbon matrix. As such materials were recognized alternatives for the same function, an express suggestion of the substitution of one for the other is not needed to render such substitution obvious, see In re Fout, 213 USPQ 532, In re Siebentritt, 152 USPQ 618.

The applicant argues that in claim 7 there is no surface treatment of the fiber and that the same was not taught by the reference to E.P. '504. had E.P. '504 incorporated a surface treatment for the fibers, it is believed that the reference would have suggested the same. the fact remains that the reference was silent as to a surface treatment for the same and thus it can be assumed that the fibers were not provided with any special surface treatment. Applicant's arguments to the contrary are not persuasive.

The applicant argues that the reference to ZE.P. '504 failed to teach that one skilled in the art would have provided a protective layer of thermostructural material as identified in claim 22. however, the reference formed the entire crucible from thermostructural material and thus clearly provided a layer of material which was thermostructural for protection (as the carbon-carbon composite material was thermostructural).

Regarding claim 23, the applicant argues that there is no evidence of the use of infiltration simultaneously for plural crucibles. The applicant is advised that the reference to E.P. '504 clearly desired to form two bowls simultaneously in the winding operation. Infiltration via chemical vapor deposition simultaneously for both so produced halves would have increased productivity at only the cost of a larger infiltration device. As the reference infiltrated the assembly with more carbon, it would have been obvious to employ infiltrate two crucibles simultaneously as the reference desired to produce multiple crucibles simultaneously. As preciously noted infiltration devices capable of infiltrating multiple performs simultaneously were taken as conventional in the art (as a function of the size of the infiltrating device employed) and it certainly would have been within the purview of the ordinary artisan to utilize such known devices in E.P. '504 as the reference desired to produce multiple crucibles simultaneously.

Regarding claim 13, the reference to Soviet Union '755 did in fact form the plug from two pieces of material 4, and 5 which were stated to have been formed from the same material as the remaining body of the crucible. To form the same from thermostructural material (as E.P. '504 formed the body therein from such material) would have been obvious and was suggested by Soviet Union '755. regarding claim 15, the reference to Soviet Union '755 suggested coating

the plugs with precursor material for forming graphite. Clearly, the reference intended to graphitize the same subsequent to assembly. To provide infiltration to a thermostructural material after assembly of a thermostructural plug would have been obvious in light of such a suggestion in Soviet Union '755.

Regarding claims 16-19, the applicant argues that these claims are patentable because the previously discussed claims are patentable over the prior art of record. However, as addressed above, this has not been found to be persuasive. Additionally, the applicant is advised that the references to Holcombe, Kondo and Metter clearly expressed that a silicon carbide coating would have been an alternative to a plyrolitic carbon coating for a crucible. Certainly, as the pyrolitic carbon coating was formed via infiltration the silicon carbide coatings would have been known to have been formed in a like manner.

Applicant is advised regarding the additional arguments presented, that applicant is essentially arguing that the claimed invention was mat taught or suggested by the overall combination, however the claims at hand were suggested by the same as evidenced by the combination of E.P. '504 with Soviet Union '755.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Daws suggested application of a plug of thermostructural material for a repair of a ceramic composite material.

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeff H. Aftergut whose telephone number is 703-308-2069. Subsequent to December 25, 2003, the examiner can be reached at 571-272-1212. The examiner can normally be reached on Monday-Friday 6:30-3:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on 703-308-3853. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Jeff H. Aftergut
Primary Examiner
Art Unit 1733

JHA
October 26, 2003